in FIG. 11, it is apparent to provide plural ventilation passages at suitable positions in the heater.

In the case where any number of ventilation passages are provided in any form, a total cross sectional area of the passage or passages should be not less than 0.1 mm^2, preferably not less than 0.3 mm^2. Further, it is preferred that the ventilation groove or grooves be dimensionsed so that a total circumferential area of the heater in which the groove or grooves are formed, will not be greater than one-third of the entire circumferential surface area of the heater.

While the present invention has been described in its preferred embodiments, it is to be understood that the invention is not limited thereto but may be otherwise embodied within the scope of the appended claims.

What is claimed is:

1. An oxygen sensor comprising:

a tubular solid electrolyte body having an elongate bore therein, a first end of said elongate bore is closed by one end of said tubular solid electrolyte body and a second end of said elongate bore is open at a second end of said tubular solid electrolyte body, said tubular body having reference and measuring electrodes on inner and outer surfaces thereof, respectively;

a housing body which supports said tubular solid electrolyte body such that said outer surface of said tubular body is exposed at said one end of said tubular body to an exhaust gas, said housing body maintaining said elongate bore in a gas-tight condition with respect to said exhaust gas and said one end of said tubular body extends outwardly from said housing body; and

a bar-shaped heater inserted in said elongate bore of said tubular solid electrolyte body, and comprising a resistance heating portion having a positive temperature coefficient of resistance of not less than 0.3%/°C.,

and a ceramic body carrying said resistance heating portion, the resistance heating portion being located only in said one end of the tubular body which extends outwardly from the housing body and not extending past said housing body.

2. An oxygen sensor as recited in claim 1, wherein said bar-shaped heater comprises a bar-shaped mass of alumina and a resistance wire embedded in said mass of alumina.

3. An oxygen sensor as recited in claim 2, wherein said resistance wire is made of tungsten.

4. An oxygen sensor as recited in claim 1, wherein said bar-shaped heater comprises a first mass of alumina, a second mass of alumina cooperating with said first mass of alumina to form said ceramic body, and an imprint of an electrically resistant material carried on a mating between said first and second masses of alumina.

5. An oxygen sensor as recited in claim 4, wherein said electrically resistant material includes tungsten as a primary component thereof.

6. An oxygen sensor as recited in claim 1, wherein said bar-shaped heater is disposed in said elongate bore with a total diametric gap of 0.3–0.7 mm with respect to said inner surface of said tubular solid electrolyte body.

7. An oxygen sensor as recited in claim 1, wherein said bar-shaped heater has at least one ventilation passage for free circulation of ambient air in said elongate bore to expose said reference electrode to a fresh volume of the ambient air.

8. An oxygen sensor as recited in claim 7, wherein said ventilation passage is a groove formed in an outer peripheral surface of said bar-shaped heater along a longitudinal length thereof.

9. An oxygen sensor as recited in claim 8, wherein bar-shaped heater in which said at least one ventilation passage occupies not greater than one-third of an entire circumferential area of said bar-shaped heater.

10. An oxygen sensor as recited in claim 7, wherein said ventilation passage is a bore formed through a radially central part of said bar-shaped heater.

11. An oxygen sensor as recited in claim 1, wherein said at least one ventilation passage has a total cross sectional area of not less than 0.1 mm^2.

12. An oxygen sensor as recited in claim 1, further comprising a protective tube made of metal and enclosing an end portion of said tubular solid electrolyte body adjacent said one end thereof and having an opening for introducing said exhaust gas into said protective tube for exposure of said one end of the tubular solid electrolyte body to said exhaust gas.

13. An oxygen sensor as recited in claim 1, wherein said reference and measuring electrodes are made of porous platinum.

14. An oxygen sensor comprising:

a tubular solid electrolyte body having an elongate bore therein, a first end of said elongate bore is closed by one end of said tubular solid electrolyte body and a second end of said elongate bore is open at a second end of said tubular solid electrolyte body, said tubular body having reference and measuring electrodes on inner and outer surfaces thereof, respectively;

a housing body which supports said tubular solid electrolyte body such that said outer surface of said tubular body is exposed at said one end of said tubular body to an exhaust gas, said housing body maintaining said elongate bore in a gas-tight condition with respect to said exhaust gas and said one end of said tubular body extends outwardly from said housing body; and

a bar-shaped heater inserted in said elongate bore of said tubular solid electrolyte body, and comprising a resistance heating portion having a positive temperature coefficient of resistance of not less than 0.3%/°C. and a ceramic body carrying said resistance heating portion so as to embed the resistance heating portion therein, the resistance heating portion being located only in said one end of the tubular body which extends outwardly from the housing body and not extending past said housing body.

15. An oxygen sensor comprising:

a tubular solid electrolyte body having an elongate bore therein, a first end of said elongate bore is closed by one end of said tubular solid electrolyte body and a second end of said elongate bore is open at a second end of said tubular solid electrolyte body, said tubular body having reference and measuring electrodes on inner and outer surfaces thereof, respectively;

a housing body which supports said tubular solid electrolyte body such that said outer surface of said tubular body is exposed at said one end of said tubular body to an exhaust gas, said housing body maintaining said elongate bore in a gas-tight condition with respect to said exhaust gas and said one end of said tubular body extends outwardly from said housing body;